Subject: 2D FFT help
Posted by Randall Skelton on Tue, 08 Oct 2002 14:58:32 GMT
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Greetings all,

I am trying to perform a multi-dimensional FFT in IDL. I thought I had this figured out (example 1) but I am now feeling (example 2) that this isn't quite right. Can someone please help me overcome my misconception?

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; Example 1: Quick 2D FFT testing - square in a plane

a = fltarr(128,128)   ; 2^n sized array
a[62:66,62:66] = 1    ; NB: this is a square, not a circle

; Plot the input
surface, a

; Shift the array (element 0 must contains the zero frequency component)
a_shifted = shift(a, -1*64, -1*64)

; Perform the FFT
b = fft(a_shifted, /double)

; Shift the array (correct element 0 being the zero frequency component)
b_fixed = shift(b, -1*64, -1*64)

; Plot the result
surface, b_fixed


;=======================================================
; Example 2: Diagonal

cov = fltarr(128,128)            ; 2^n sized array
cov[indgen(128),indgen(128)] = 1  ; diagonal

; Plot the input
surface, cov

; Shift the array (element 0 must contains the zero frequency component)
cov_shifted = shift(cov, -1*64, -1*64)

; Perform the FFT
spec_cov = fft(cov_shifted, /double)

; Shift the array (correct element 0 being the zero frequency component)
```

```
spec_fixed = shift(spec_cov, -1*64, -1*64)

; Plot the result
surface, spec_fixed
```

So, in the first case, the answer looks correct and is a slight deviation from the standard textbook example of the FFT of a cylinder. In the second case, however, the results looks to be rotated by 90 degrees in the plane, i.e. I think the result and input should look identical. Can someone explain what I have done wrong? I am also somewhat troubled by the spike currently at (0,0)?

Any and all help is greatly appreciated!

Cheers,
Randall
